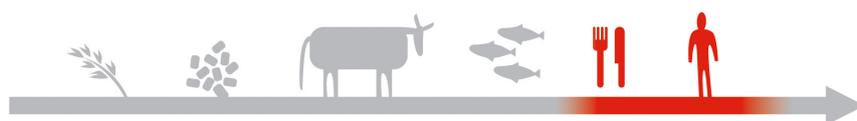


The occurrence of *Campylobacter* spp. in Norwegian broiler flocks older than 50 days of age at slaughter - a pilot study



Veterinærinstituttet
Norwegian Veterinary Institute



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Summary

A study in 2018 on broiler flocks older than 50 days of age at slaughter, showed that 43.3% of the flocks tested positive for *Campylobacter jejuni* when sampled at slaughter. Caecal material from 104 broiler flocks slaughtered at three different slaughterhouses during the period May through October was tested by cultivation. *Campylobacter jejuni* was the only *Campylobacter* sp. detected. The flocks from the slaughterhouse with the oldest flocks had the highest prevalence of *Campylobacter* sp. (87.5%). These flocks did also have outdoor access. The flocks from the slaughterhouse with the youngest flocks did not have outdoor access and had the lowest prevalence (22.2%) of *Campylobacter* sp. The number of samples in the study is too low to draw wide conclusions, but the results indicate age and outdoor access as important risk factors. This is in accordance with results from other studies.

Sammendrag

En studie i 2018 på forekomst av *Campylobacter* spp. hos kylling som slaktes når de er eldre enn 50 dager, viste en forekomst av *Campylobacter jejuni* i 43,3 % av prøvene. Blindtarmsmateriale fra 104 flokker slaktet ved tre forskjellige slakterier i perioden mai til og med oktober ble analysert ved dyrking. *Campylobacter jejuni* var den eneste *Campylobacter* sp. som ble påvist. Resultatene viste at flokkene fra slakteriet med de i snitt eldste flokkene hadde den høyeste forekomsten av *Campylobacter* sp. (87,5 %). Disse flokkene var også rapportert å ha tilgang til utearealer. Flokkene fra slakteriet med de i snitt yngste flokkene var ikke rapportert å gå ute, og disse flokkene hadde også den laveste forekomsten av *Campylobacter* (22,2 %). Antallet prøver i undersøkelsen er for lavt til å kunne trekke omfattende konklusjoner, men resultatene indikerer at alder på kyllingene og mulighet for å gå ute er viktige risikofaktorer for å få *Campylobacter*-smitte inn i flokken. Dette er i overensstemmelse med resultater fra andre undersøkelser.

Introduction

Campylobacteriosis is currently the most commonly reported bacterial infectious disease in the Norwegian human population (www.fhi.no). In almost half of the cases, the infection is acquired in Norway. Consumption of poultry meat purchased raw has been identified as a significant risk factor in Norway, together with drinking un-disinfected water, eating at barbecues, occupational exposure to animals, and eating undercooked pork (1).

The action plan regarding *Campylobacter* spp. in Norwegian broilers slaughtered up to 50 days of age has been running since spring 2001 (2). The action plan includes a pre-slaughter surveillance of the flocks and freezing or heat-treating of carcasses/meat from flocks positive for *Campylobacter*. The action plan does not however include surveillance of broilers older than 50 days of age at slaughter. These older broilers cover several different farming systems, from conventional indoor-raised to organic farming. Some of the farming systems are free-range, other flocks are more or less sheltered from the outdoor environment. It is recognized that contamination of broiler flocks with *Campylobacter* spp. is acquired from the environment (3, 4). Broilers older than 50 days of age at slaughter were last included in a surveillance programme in Norway in 2006. To get updated information on the *Campylobacter* status among flocks not included in the programme, there was a need for a new survey.

Aims

The objective was to get updated information on the occurrence of *Campylobacter* spp. among broiler flocks not included in the surveillance programme, to assess if meat products from these broilers might constitute a food safety risk to the consumers.

Materials and methods

Broiler flocks older than 50 days of age at the time of slaughter, were sampled by the Norwegian Food Safety Authority at three different slaughterhouses. The sampling period was May through October, the same time period as the surveillance programme regarding *Campylobacter* spp. in Norwegian broilers slaughtered before 50 days of age. Caeca from 10 broilers per flock were pooled and sent to the Norwegian Veterinary Institute for cultivation of thermotolerant *Campylobacter* spp. Caecal material was plated directly onto mCCDA agar and the agar plates were incubated in microaerophilic conditions at $41.5\pm 1^\circ\text{C}$ for 44 ± 4 h. Colonies resembling *Campylobacter* spp. were identified to species by MALDI-TOF.

This was an anonymous study so the identity of the producers/flocks were not available. A questionnaire filled in at the slaughterhouse asked for the age of the broilers at slaughter, and if the flocks had outdoor access or not. When the flock's age was reported as an age range, the age was counted as the mean value of the range.

Results and Discussion

A total of 104 flocks were sampled, estimated to constitute roughly 50% of the flocks older than 50 days of age slaughtered in Norway in the sampling period. The three participating slaughterhouses are located in the southern and eastern part of Norway. Forty-five samples/flocks (43.3%) tested positive for *Campylobacter jejuni*, which was the only *Campylobacter* sp. identified. Monthly distribution of flocks positive for *Campylobacter jejuni* (Table 1) did not show the same typical distribution as for the flocks in the action plan. The prevalence of *Campylobacter* spp. in broilers slaughtered up to 50 days of age (the action plan) has shown a distinct peak in July and August over the years (5). The number of sampled flocks pr. month in this study however, is too small to draw conclusions. There is also a possibility that some flocks in this study have been sampled twice due to split slaughter of the flock.

Table 1. Flocks/samples testing positive for *Campylobacter jejuni* at slaughter.

Month	N	No. positive	% pos.
May	15	3	20
June	19	4	21.1
July	18	11	61.1
August	15	7	46.7
September	17	10	58.8
October	20	10	50
Total	104	45	43.3

The age of the sampled flocks ranged between 52 - 92 days at slaughter. For one flock there was no information about age. From one slaughterhouse (No. 1), the age at slaughter was given as age ranges; 53 - 83 days, 65 - 71 days, 72 - 78 days, 70 - 85 days and 86 - 92 days, respectively. The estimate of the mean age of all the flocks in the study was 63 days at slaughter. *Campylobacter* results related to age indicate that the older chickens had the highest prevalence (Table 2). This is in concordance with other studies (6, 7)

Table 2. Flocks at different ages testing positive for *Campylobacter jejuni* at slaughter.

Age at slaughter (days)	N	No. positive	% pos.
52 - 58	50	7	14
62 - 69*	13	8	61.5
> 69**	40	30	75
Total	103	45	

*Including flocks with mean values of the age ranges 53-83, 65-71.

** Including flocks with mean values of the age ranges 72-78, 70-85 and 86-92.

Table 3 shows the results from the three participating slaughterhouses. Slaughterhouse No.1 had the highest incidence of *Campylobacter* positive flocks. The flocks from this slaughterhouse were the oldest and all had reported outdoor access, both risk factors for *Campylobacter* spp. (6, 7). Flocks from slaughterhouse No.3 had the lowest mean age, and none of the flocks had outdoor access (personal communication). Slaughterhouse No.2 delivered almost 60% of the flocks and had a mixture of flocks with and without outdoor access.

Table 3. Flocks testing positive for *Campylobacter jejuni* at the different slaughterhouses.

Slaughterhouse	N	Mean age at slaughter	No. positive	% pos.
No.1	24	74.9*	21	87.5
No.2	62**	62.2	20	32.3
No.3	18	55.3	4	22.2
Total	104	64.0	45	43.3

*Estimate from the reported age ranges.

**Including the flock with age unknown, stipulated to be the mean value of the flocks of the slaughterhouse

The prevalence in this pilot study was much higher than the prevalence among flocks in the action plan (6.3%) sampled in the same period (5). Taking the risk factors older broilers and several flocks with outdoor access into consideration, the result was not unexpected.

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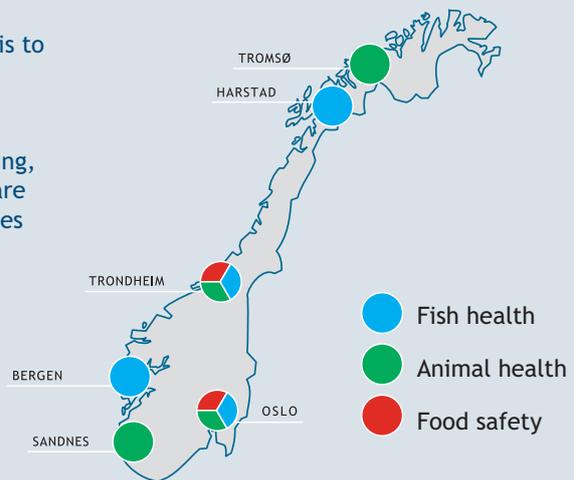
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